

Grade 6

Mathematics

Item Specifications



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Introduction

In 2014 Missouri legislators passed House Bill 1490, mandating the development of the Missouri Learning Expectations. In April of 2016, these Missouri Learning Expectations were adopted by the State Board of Education. Groups of Missouri educators from across the state collaborated to create the documents necessary to support the implementation of these expectations.

One of the documents developed is the item specification document, which includes all Missouri grade level/course expectations arranged by domains/strands. It defines what could be measured on a variety of assessments. The document serves as the foundation of the assessment development process.

Although teachers may use this document to provide clarity to the expectations, these specifications are intended for summative, benchmark, and large-scale assessment purposes.

Components of the item specifications include:

Expectation Unwrapped breaks down a list of clearly delineated content and skills the students are expected to know and be able to do upon mastery of the Expectation.

Depth of Knowledge (DOK) Ceiling indicates the highest level of cognitive complexity that would typically be assessed on a large scale assessment. The DOK ceiling is not intended to limit the complexity one might reach in classroom instruction.

Item Format indicates the types of items used in large scale assessment. For each expectation, the item format specifies the type best suited for that particular expectation.

Text Types suggests a broad list of text types for both literary and informational expectations. This list is not intended to be all inclusive: other text types may be used in the classroom setting. The expectations were written in grade level bands; for this reason, the progression of the expectations relies upon increasing levels of quantitative and qualitative text complexities.

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Content Limits/Assessment Boundaries are parameters that item writers should consider when developing a large scale assessment. For example, some expectations should not be assessed on a large scale assessment but are better suited for local assessment.

Sample stems are examples that address the specific elements of each expectation and address varying DOK levels. The sample stems provided in this document are in no way intended to limit the depth and breadth of possible item stems. The expectation should be assessed in a variety of ways.

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Frequently asked questions for Item Specification and Sample Stems

1. What is the purpose of the Item Specification document?

Historically, Item Specification documents are written for test item writers. In Missouri, this document was seen as a resource for not only item writers, but teachers as well. The unwrapped section should provide more detail on the meaning of the standard and the sample stems should provide example items that also help clarify the standard. In this update, the language used in the Expanded Expectations document was included to merge the two documents for easier access. In some standards a “Notes” section was added to provide additional information.

2. Why do some unwrapped sections have the same few sentences at the beginning?

For standards that have multiple parts and are listed as sub expectations, e.g., NF.C.5.b, the first part highlights the intent of that standard series. Often, these standards should be taught together as they develop a bigger idea or concept.

3. Why is the Fluency definition only on some standards?

Certainly, students having experience using different strategies and picking the strategy they feel best for given situations is important to improving student knowledge in mathematics. The Missouri Educators working on the document felt it important to highlight areas where student access to multiple strategies would provide the greatest support. Listing fluency in all standards would likely lessen the impact needed.

4. What does the “e.g.” mean when listed in the unwrapped section?

The “e.g.” is a way to highlight a list of examples, ideas, or concepts. It is **not** an exhaustive list, nor is it intended to represent the best examples. It is merely a partial list to provide some examples.

5. What does “with or without context” mean?

This phrase was used to highlight that the math problems might have some situational context or could possibly be a strictly number or symbol situation. The Educators working on this update wanted the focus to be on using math to solve problem situations rather than a focus on “real world” problems.

6. Are the Sample Stems examples of summative test items?

The Sample Stems could be a classroom item or possibly an assessment item. In some cases, the problem used would have to be adjusted to use on a Statewide assessment. The goal was to give students and teachers a problem that aligns to the standard. The Stems provided in the document are an example. The educators assisting with the update in some cases created more than one example and those are listed at the bottom of the document. All examples are good, some fit better on the page within the Item Specification which have determined those shown in both places.

7. Why are there no answers listed with the Sample Stems?

The focus of the Sample Stems should be on the work students can demonstrate to indicate their level of understanding for the given standard. While the answer is one component, when given, it frequently becomes the focus which does not provide important information in the learning process.

8. What does “No Limits” mean in the Limits and Boundaries section?

Where there are no limits or boundaries to be listed, “No Limits” was used to indicate this situation and help those using the document understand that it wasn’t an oversight. IMPORTANT NOTE: if the standard itself or the cluster heading lists a specific limit, e.g., specific denominators, size or type of number, that was not duplicated in the Limits section.

9. Why do some words show a short definition?

While this does not serve as a replacement for a glossary, there were terms within the unwrapping that the committee felt should have meaning included. This occurs in the standard where it specifically addresses the concept in the standard, e.g., cardinality, trapezoid.

10. Why are Kindergarten and Grade 1 Sample Stems a bit different?

Students in Kindergarten and Grade 1 are beginning readers, so teachers should expect to read problems to the students rather than only providing problems to be solved.

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Mathematics		6.RP.A.1
RP	Ratios and Proportional Relationships	PRIORITY STANDARD
A	Understand and use ratios to solve problems.	
1	Understand a ratio as a comparison of two quantities and represent these comparisons.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will understand a ratio as a comparison of two quantities and represent these comparisons in the form of ratios and as verbal statements.</p> <p>The student will represent a ratio as a comparison of two quantities.</p> <p>The student will represent ratios in multiple ways: a to b, $a:b$ or $\frac{a}{b}$.</p> <p>The student will understand that ratios can be compared whole to part, part to whole or part to part.</p> <p>The student will represent the comparison as a verbal model in context.</p> <p>Note: In 6th grade ratios, e.g., $\frac{a}{b}$, where a will be a positive rational number and b will be a natural number.</p> <p>The concept of division of integers is not a 6th grade standard.</p>		<p><u>Sample Stems</u></p> <p>A TV sells for \$450. The store's wholesale price was \$375. What is the ratio of the profit to the wholesale price?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

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Mathematics		6.RP.A.2
RP	Ratios and Proportional Relationships	
A	Understand and use ratios to solve problems.	
2	Understand the concept of a unit rate associated with a ratio, and describe the meaning of unit rate.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will understand the concept of a unit rate $\frac{a}{b}$ associated with a ratio $a:b$ with $b \neq 0$ and describe the meaning of unit rate in the context of the relationship, e.g., If a 4-pound bag of apples costs \$3, what is the unit rate in price per pound.</p> <p>The student will understand that in unit rate, $\frac{a}{b}$, $b = 1$.</p> <p>The student will determine a unit rate when given a ratio.</p> <p>Note: In 6th grade ratios, e.g., $\frac{a}{b}$, where a will be a positive rational number and b will be a natural number.</p> <p>The concept of division of integers is not a 6th grade standard.</p>		<p><u>Sample Stems</u></p> <p>Jason drove 225 miles in 3 hours. Find and interpret the unit rate for the trip.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.RP.A.3.a										
RP	Ratios and Proportional Relationships	PRIORITY STANDARD										
A	Understand and use ratios to solve problems.											
3	Solve problems involving ratios and rates.											
a	Create tables of equivalent ratios, find missing values in the tables and plot the pairs of values on the Cartesian coordinate plane.											
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.RP.A.3 (a through d) show how 6th grade students will solve problems with or without context involving ratios and rates utilizing various representations such as tables of equivalent ratios, tape diagrams, bar models, double number line diagrams, and/or equations.</p> <p>The student will make tables of equivalent ratios, find missing values in the tables, and plot the pairs of values on the Cartesian coordinate plane. Use tables to compare ratios.</p>		<p><u>Sample Stems</u></p> <p>According to the M&M website, there are 14 yellow M&Ms in each 8 oz. bag. If you need 75 yellow M&Ms for an art project, how many bags will you need to purchase? Use the chart to help determine your answer.</p> <table><tr><th>Number of Bags</th><th>Number of Yellow M&Ms</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table> <p>If you were to graph your chart values, how would the graph show the number of bags you would need for your art project?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>	Number of Bags	Number of Yellow M&Ms								
Number of Bags	Number of Yellow M&Ms											
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit values to positive rational numbers, not including complex fractions.</p> <p>Limit table values to those that are proportional.</p> <p>Limit values to the first quadrant on the Cartesian coordinate plane.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>										
<p><u>DOK Ceiling:</u> 3</p>												
<p><u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced</p>												

Grade 6 Mathematics

Mathematics		6.RP.A.3.b
RP	Ratios and Proportional Relationships	PRIORITY STANDARD
A	Understand and use ratios to solve problems.	
3	Solve problems involving ratios and rates.	
b	Solve unit rate problems.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.RP.A.3 (a through d) show how 6th grade students will solve problems with or without context involving ratios and rates utilizing various representations such as tables of equivalent ratios, tape diagrams, bar models, double number line diagrams, and/or equations.</p> <p>The student will solve unit rate problems, e.g., pricing and constant speed.</p> <p>The student will use unit rates to compare two or more quantities.</p> <p>Mathematical Fluency is more than a quick answer on some timed test. Students demonstrate Fluency when they do mathematics using an <u>appropriate strategy</u> in a reasonable amount of time, <u>knowing multiple processes</u> and can apply or adapt strategies to find a correct solution.</p> <p>The student will use and explain multiple strategies to solve problems with or without context involving unit rates.</p>		<p><u>Sample Stems</u></p> <p>Jane needs sugar. Should she buy a four-pound bag for \$2.58 or a five-pound bag that is on sale for \$3.25 if she wants the best deal? Explain how she could determine the best deal and identify the unit rate she might have used in making her decision.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit values to positive rational numbers, not including complex fractions.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.RP.A.3.c
RP	Ratios and Proportional Relationships	PRIORITY STANDARD
A	Understand and use ratios to solve problems.	
3	Solve problems involving ratios and rates.	
c	Solve percent problems.	
<u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u>		<u>Sample Stems</u>
<p>The expectations in 6.RP.A.3 (a through d) show how 6th grade students will solve problems with or without context involving ratios and rates utilizing various representations such as tables of equivalent ratios, tape diagrams, bar models, double number line diagrams, and/or equations.</p> <p>The student will calculate a percent of a quantity as a rate per 100; given a percent, solve problems involving finding the whole given a part and the part given the whole.</p> <p>Note: Ratios and rates can include values over 100% or values less than 1%.</p> <p>Mathematical Fluency is more than a quick answer on some timed test. Students demonstrate Fluency when they do mathematics using an <u>appropriate strategy</u> in a reasonable amount of time, <u>knowing multiple processes</u> and can apply or adapt strategies to find a correct solution.</p> <p>The student will use and explain multiple strategies to solve problems with or without context involving percent problems.</p>		<p>Jada has a new puppy that weighs 9 pounds. The vet says that the puppy is now at about 30% of its adult weight. What will be the adult weight of the puppy?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u>		<u>Calculator Designation</u>
Limit values to positive rational numbers, not including complex fractions.		YES – a calculator will be available for items
DOK Ceiling: 3		
Item Format: Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.RP.A.3.d
RP	Ratios and Proportional Relationships	PRIORITY STANDARD
A	Understand and use ratios to solve problems.	
3	Solve problems involving ratios and rates.	
d	Convert measurement units within and between two systems of measurement.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.RP.A.3 (a through d) show how 6th grade students will solve problems with or without context involving ratios and rates utilizing various representations such as tables of equivalent ratios, tape diagrams, bar models, double number line diagrams, and/or equations.</p> <p>The student will convert measurement units within and between two systems of measurement while solving problems. Given a conversion factor, e.g., 1 in. = 2.54 cm, use ratios to compare sizes of similar figures with different units.</p>		<p><u>Sample Stems</u></p> <p>Jimmy grew 2 inches during the school year and his best friend grew 5 centimeters. Given a conversion factor, e.g., 1 in. = 2.54 cm, use ratios to compare which student grew more.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.NS.A.1.a
NS	Number Sense and Operations	PRIORITY STANDARD
A	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	
1	Compute and interpret quotients of positive fractions.	
a	Solve problems involving division of fractions by fractions.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.NS.A show how 6th grade students will solve problems with or without context involving division of fractions by fractions, including reasoning strategies such as using visual fraction models, area models, and/or equations to represent the problem.</p> <p>The student will compute quotients of positive fractions.</p> <p>The student will interpret the results.</p> <p>Note:</p> <p>In 6th grade division problems are generally represented as follows: $\frac{2}{3} \div \frac{4}{5}$ not $\frac{\frac{2}{3}}{\frac{4}{5}}$.</p> <p>Mathematical Fluency is more than a quick answer on some timed test. Students demonstrate Fluency when they do mathematics using an <u>appropriate strategy</u> in a reasonable amount of time, <u>knowing multiple processes</u> and can apply or adapt strategies to find a correct solution.</p> <p>The student will use and explain multiple strategies to solve problems with or without context involving division of fractions by fractions.</p>		<p><u>Sample Stems</u></p> <p>Mary bought $12\frac{1}{2}$ yards of fabric. Each craft project requires $1\frac{7}{8}$ yards. How many craft projects can she complete?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.NS.B.2
NS	Number Sense and Operations	
B	Compute with non-negative multi-digit numbers, and find common factors and multiples.	
2	Demonstrate fluency with division of multi-digit whole numbers.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will demonstrate fluency with division of multi-digit whole numbers.</p> <p>The student will decontextualize and contextualize problems and solutions to explain his or her reasoning in division of multi-digit whole numbers.</p> <p>Mathematical Fluency is more than a quick answer on some timed test. Students demonstrate Fluency when they do mathematics using an <u>appropriate strategy</u> in a reasonable amount of time, <u>knowing multiple processes</u> and can apply or adapt strategies to find a correct solution..</p> <p>The student will use multiple representations to model problems with or without context involving division of multi-digit whole numbers.</p>		<p><u>Sample Stems</u></p> <p>A student is exploring different ways to show what happens when they divide two numbers. How could a student use what they know about $600 \div 25$ to show what $806 \div 26$ equals?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit divisor to three digits. Limit dividend to six digits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.NS.B.3
NS	Number Sense and Operations	
B	Compute with non-negative multi-digit numbers, and find common factors and multiples.	
3	Demonstrate fluency with addition, subtraction, multiplication and division of decimals.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will demonstrate fluency with addition, subtraction, multiplication, and division of decimals.</p> <p>The student will decontextualize and contextualize problems and solutions to explain his or her reasoning involving addition, subtraction, multiplication, and division of decimals.</p> <p>Note: The symbols for multiplication include: “x”, “ • ”, “* ”, or the use of grouping symbols.</p> <p>Mathematical Fluency is more than a quick answer on some timed test. Students demonstrate Fluency when they do mathematics using an <u>appropriate strategy</u> in a reasonable amount of time, <u>knowing multiple processes</u> and can apply or adapt strategies to find a correct solution.</p> <p>The student will use multiple representations to model problems with or without context involving addition, subtraction, multiplication, and division of decimals.</p>		<p><u>Sample Stems</u></p> <p>Teri’s teacher has shared a rule when multiplying or dividing with decimals. The rule involves moving the decimal point. Pick two decimal numbers and use them to show what must happen when you multiply and divide by those numbers. The explanation could include models or other mathematical descriptions.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to the thousandth place with division.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.NS.B.4.a
NS	Number Sense and Operations	
B	Compute with non-negative multi-digit numbers, and find common factors and multiples.	
4	Find common factors and multiples.	
a	Find the greatest common factor (GCF) and the least common multiple (LCM).	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.NS.B.4 (a and b) show how 6th grade students will find common factors and multiples.</p> <p>The student will find common factors and multiples, including the greatest common factor (GCF) and least common multiple (LCM).</p> <p>The student will apply LCM or GCF to problems with or without context.</p>		<p><u>Sample Stems</u></p> <p>Hotdogs come in a package of 8 and buns in a package of 12. How many packages of hot dogs and packages of buns would you need to purchase to have an equal number of hot dogs and buns?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit finding greatest common factor and least common multiple of no more than 3 numbers.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

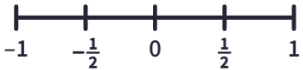
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Mathematics		6.NS.B.4.b
NS	Number Sense and Operations	PRIORITY STANDARD
B	Compute with non-negative multi-digit numbers, and find common factors and multiples.	
4	Find common factors and multiples.	
b	Use the distributive property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.NS.B.4 (a and b) show how 6th grade students will find common factors and multiples.</p> <p>The student will use the distributive property to decompose a sum of two whole numbers using a common factor as a multiple of a sum of two whole numbers, e.g., $48+24$ can be decomposed to $24(2) + 24(1)$ and rewritten as $24(2+1)$. Students should explore other sums of two numbers that can be decomposed and rewritten and still be equivalent to the sum.</p>		<p><u>Sample Stems</u></p> <p>Use the distributive property to show an equivalent expression for the problem listed below.</p> <p style="text-align: center;">$66 + 90$</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to whole numbers less than or equal to two hundred.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

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Mathematics		6.NS.C.5
NS	Number Sense and Operations	
C	Apply and extend previous understandings of numbers to the system of rational numbers.	
5	Use positive and negative numbers to represent quantities.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will use positive and negative numbers to represent quantities with or without context, including explaining the meaning of 0 in each situation.</p>		<p><u>Sample Stems</u></p> <p>Use positive and negative numbers to represent the result of the following situation. A basketball team gained 4 new players after 6 players left the team.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 2		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.NS.C.6.a
NS	Number Sense and Operations	
C	Apply and extend previous understandings of numbers to the system of rational numbers.	
6	Locate a rational number as a point on the number line.	
a	Locate rational numbers on a horizontal or vertical number line.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.NS.C.6 (a through c) show how 6th grade students will locate a rational number as a point on a number line (vertical or horizontal).</p> <p>The student will locate rational numbers on a horizontal or vertical number line.</p>		<p><u>Sample Stems</u></p> <p>The fraction $\frac{7}{9}$ is closest to what number on the number line below?</p>  <p style="text-align: center;"> -1 $-\frac{1}{2}$ 0 $\frac{1}{2}$ 1 </p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit denominators to less than or equal to 10.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.NS.C.6.b
NS	Number Sense and Operations	
C	Apply and extend previous understandings of numbers to the system of rational numbers.	
6	Locate a rational number as a point on the number line.	
b	Write, interpret and explain problems of ordering of rational numbers.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.NS.C.6 (a through c) show how 6th grade students will locate a rational number as a point on a number line (vertical or horizontal).</p> <p>The student will write, interpret, and explain statements of order for rational numbers with or without context.</p>		<p><u>Sample Stems</u></p> <p>Place the following numbers in order from least to greatest. Be sure to explain why you have ordered them in this way.</p> <p style="text-align: center;"> $\frac{25}{8}$ 3.111111 $\frac{23}{9}$ $2\frac{4}{5}$ </p> <p style="text-align: right;">Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit denominator to less than or equal to 1,000.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.NS.C.6.c
NS	Number Sense and Operations	PRIORITY STANDARD
C	Apply and extend previous understandings of numbers to the system of rational numbers.	
6	Locate a rational number as a point on the number line.	
c	Understand that a number and its opposite (additive inverse) are located on opposite sides of zero on the number line.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.NS.C.6 (a through c) show how 6th grade students will locate a rational number as a point on a number line (vertical or horizontal).</p> <p>The student will understand that a number and its opposite (additive inverse) are located on opposite sides of zero on the number line. A number and its opposite (additive inverse) are equidistant from zero.</p> <p>The student will understand that their sum will always be zero.</p> <p>Note: The focus of this standard is developing an understanding additive inverse without formally defining that idea in this grade.</p>		<p><u>Sample Stems</u></p> <p>Identify the additive inverse of (-5) and use a number line to explain what is special about numbers that are additive inverses to each other.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit denominators to less than or equal to 10.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.NS.C.7
NS	Number Sense and Operations	PRIORITY STANDARD
C	Apply and extend previous understandings of numbers to the system of rational numbers.	
7	Understand that the absolute value of a rational number is its distance from 0 on the number line.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will understand that the absolute value of a rational number is its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in problems with or without context.</p> <p>The student will understand that distances are always positive.</p> <p>The student will calculate the absolute value of integers.</p>		<p><u>Sample Stems</u></p> <p>When is the absolute value of a number equal to zero? Why is absolute value positive?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit problems so no operations are inside the absolute value bars.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.NS.C.8
NS	Number Sense and Operations	PRIORITY STANDARD
C	Apply and extend previous understandings of numbers to the system of rational numbers.	
8	Extend prior knowledge to generate equivalent representations of rational numbers between fractions, decimals and percentages (limited to terminating decimals and/or benchmark fractions of $\frac{1}{3}$ and $\frac{2}{3}$).	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will extend prior knowledge to generate equivalent representations of rational numbers by converting between fractions, decimals (decimal fractions), and percentages. These equivalent representations include $\frac{1}{3}$, $\frac{2}{3}$, or terminating decimals.</p>		<p><u>Sample Stems</u></p> <p>Using a 10x10 grid, identify the decimal and percent equivalents of $\frac{4}{5}$. Explain how you know that the fraction, decimal, and percent are equivalent to each other.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit terminating decimals to thousandths place.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EE1.A.1
EE1	Expressions, Equations and Inequalities	PRIORITY STANDARD
A	Apply and extend previous understandings of arithmetic to algebraic expressions.	
1	Describe the difference between an expression and an equation.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will describe the difference between an expression and an equation. Expressions do not contain an equal sign, e.g., $5+7$, $x-10$. Equations contain two quantities that are equal to each other, e.g., $10+2=12$, $2x=10$.</p>		<p><u>Sample Stems</u></p> <p>Tammy makes the following claims about expressions.</p> <ul style="list-style-type: none"> a. They contain only numbers. b. They contain variables. c. They are the same as equations. d. They do not have an equal sign. <p>Do you agree with Tammy? Explain why or why not for each of Tammy's claims.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
DOK Ceiling: 3		
Item Format: Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EE1.A.2.a
EEI	Expressions, Equations and Inequalities	
A	Apply and extend previous understandings of arithmetic to algebraic expressions.	
2	Create and evaluate expressions involving variables and whole number exponents.	
a	Identify parts of an expression using mathematical terminology.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.EE1.A.2 (a through e) show how 6th grade students will create and evaluate expressions involving variables and whole number exponents. This includes being able to read, write, and evaluate expressions involving whole number exponents in which variables are used to represent quantities that are either unknown or that vary.</p> <p>The student will identify parts of an expression using mathematical terminology. Mathematical terminology should include, but not limited to, term, factor, coefficient, variable, constant, and operations.</p> <p>A variable is a letter or symbol that is used in an expression, equation or inequality that represents an unknown or changing value(s).</p>		<p><u>Sample Stems</u></p> <p>Using the expression listed below, list the characteristics (parts of the expression) that describe this situation. (Note: characteristics include- terms, number of terms, coefficients, exponents, constants, and variables).</p> $10 - 6x^2 + 15x$ <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 2		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EE1.A.2.b
EEI	Expressions, Equations and Inequalities	
A	Apply and extend previous understandings of arithmetic to algebraic expressions.	
2	Create and evaluate expressions involving variables and whole number exponents.	
b	Evaluate expressions at specific values of the variables.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.EE1.A.2 (a through e) show how 6th grade students will create and evaluate expressions involving variables and whole number exponents. This includes being able to read, write, and evaluate expressions involving whole number exponents in which variables are used to represent quantities that are either unknown or that vary.</p> <p>Evaluate expressions for specific values of their variables. Include expressions that arise from formulas used in problems with or without context.</p>		<p><u>Sample Stems</u></p> <p>Evaluate the following expression when x equals 1, 5 and 10.</p> $10 + 6x^2 + 15x$ <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit whole number exponents up to the third power. Limit substituted values to positive rational numbers. Limit decimals to the thousandths place.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 2		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EE1.A.2.c
EEI	Expressions, Equations and Inequalities	
A	Apply and extend previous understandings of arithmetic to algebraic expressions.	
2	Create and evaluate expressions involving variables and whole number exponents.	
c	Evaluate non-negative rational number expressions.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.EE1.A.2 (a through e) show how 6th grade students will create and evaluate expressions involving variables and whole number exponents. This includes being able to read, write, and evaluate expressions involving whole number exponents in which variables are used to represent quantities that are either unknown or that vary.</p> <p>The student will evaluate expressions of non-negative rational numbers using the order of operations. Expressions may include addition, subtraction, multiplication, division, grouping symbols, and whole-number exponents.</p>		<p><u>Sample Stems</u></p> <p>Evaluate the following expression when $x = 4.2$ and $y = 2$.</p> y^3xy <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit whole number exponents up to the third power. Limit to no more than five operations.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 2		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EEI.A.2.d
EEI	Expressions, Equations and Inequalities	PRIORITY STANDARD
A	Apply and extend previous understandings of arithmetic to algebraic expressions.	
2	Create and evaluate expressions involving variables and whole number exponents.	
d	Write and evaluate algebraic expressions.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.EEI.A.2 (a through e) show how 6th grade students will create and evaluate expressions involving variables and whole number exponents. This includes being able to read, write, and evaluate expressions involving whole number exponents in which variables are used to represent quantities that are either unknown or that vary.</p> <p>The student will write algebraic expressions (using variables) to represent quantities in problems with or without context.</p> <p>The students will evaluate algebraic expressions with or without context.</p>		<p><u>Sample Stems</u></p> <p>Use the following information to write an algebraic expression, then solve that expression.</p> <p>Tomi is growing a sunflower plant. When Tomi got the plant, it was 7 inches tall. Over the next several weeks, Tomi found that the plant was growing 10 inches per week. How tall will the sunflower be after 10 weeks?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to positive rational numbers.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EE1.A.2.e
EEI	Expressions, Equations and Inequalities	PRIORITY STANDARD
A	Apply and extend previous understandings of arithmetic to algebraic expressions.	
2	Create and evaluate expressions involving variables and whole number exponents.	
e	Understand the meaning of the variable in the context of the situation.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.EE1.A.2 (a through e) show how 6th grade students will create and evaluate expressions involving variables and whole number exponents. This includes being able to read, write and evaluate expressions involving whole number exponents in which variables are used to represent quantities that are either unknown or that vary.</p> <p>The student will describe the meaning of the unknown quantity (variable) within the context of the problem.</p>		<p><u>Sample Stems</u></p> <p>Rex used the expression below to represent the following situation.</p> <p>Alex has 6 dollars less than James.</p> $j - 6$ <p>Describe the meaning of the variable given this situation.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EE1.A.3
EEI A 3	Expressions, Equations and Inequalities Apply and extend previous understandings of arithmetic to algebraic expressions. Identify and generate equivalent algebraic expressions using mathematical properties.	PRIORITY STANDARD
<u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u> The student will recognize (identify) that equivalent algebraic expressions are created as a result of the application of the commutative, associative, or distributive properties. The student will use multiple strategies to generate equivalent algebraic expressions using these properties to develop fluency in applying and using algebraic expressions. Note: In 6th grade, the focus of the distributive property will be on multiplication over addition. Mathematical Fluency is more than a quick answer on a timed test. Students demonstrate Fluency when they do mathematics using an <u>appropriate strategy</u> in a reasonable amount of time, <u>knowing multiple processes</u> and can apply or adapt strategies to find a correct solution. The student will use and explain multiple strategies to solve problems with or without context involving properties of integer exponents generating equivalent expressions.		<u>Sample Stems</u> Which properties can be used to show that these expressions are equivalent? 4(30 + 25) 4(25 + 30) 4(25) + 4(30) Additional Stems for 6th Grade Found at End of Document.
<u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u> Limit to positive rational numbers.		<u>Calculator Designation</u> YES – a calculator will be available for items
<u>DOK Ceiling: 2</u>		
Item Format: Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EE1.B.4
EEI B 4	Expressions, Equations and Inequalities Reason about and solve one-variable equations and inequalities. Use substitution to determine whether a given number in a specified set makes a one-variable equation or inequality true.	
<u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u> The student will use substitution to determine which number(s) in a given set makes a one-variable equation or inequality true.		<u>Sample Stems</u> Is $y = 4$ a solution to $2y + 1 > 9$? Explain why or why not.

Grade 6 Mathematics

Mathematics		6.EE.B.5
EEI	Expressions, Equations and Inequalities	PRIORITY STANDARD
B	Reason about and solve one-variable equations and inequalities.	
5	Understand that if any solutions exist, the solution set for an equation or inequality consists of values that make the equation or inequality true.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will understand that if any solution(s) exist, the solution set for an equation or inequality consists of value(s) that make the equation or inequality true.</p> <p>The student will understand that a one-variable equation could have one solution, no solutions or an infinite number of solutions that will make that equation true, e.g., $x = 3$ (one solution), $x = x + 1$ (no solutions), $x = x$ (infinite number of solutions since it is the identity).</p> <p>The student will understand that an inequality will have a solution set that will make the inequality true which has multiple solutions.</p> <p>In grade 6, equations generally are linear, and teachers should help students recognize that some “rules” expire, e.g., equations could have multiple solutions.</p>		<p><u>Sample Stems</u></p> <p>Jason earns \$9.25 an hour working and needs at least \$140 more for a new baseball bat. He wrote this inequality to represent the situation, $9.25h \geq \\$140$.</p> <p>What does the variable h stand for in the inequality? What does your solution mean?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to positive rational numbers.</p> <p>Limit to linear equations and inequalities.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EE1.B.6
EE1 B 6	Expressions, Equations and Inequalities	PRIORITY STANDARD
	Reason about and solve one-variable equations and inequalities. Write and solve equations using variables to represent quantities, and understand the meaning of the variable in the context of the situation.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will write and solve equations using variables to represent quantities in problems with or without context.</p> <p>The student will describe the meaning of the unknown quantity (variable) within the context of the problem.</p> <p>The student will describe the meaning of the solution in terms of the context of the problem.</p>		<p><u>Sample Stems</u></p> <p>One-third of a number is equal to 13. Write an algebraic equation that represents this situation. Solve for your variable and describe the meaning of the variable in this context.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to positive rational numbers. Limit to one-step equations.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<p><u>DOK Ceiling:</u> 3</p>		
<p><u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced</p>		

Grade 6 Mathematics

Mathematics		6.EE1.B.7
EE1 B 7	Expressions, Equations and Inequalities Reason about and solve one-variable equations and inequalities. Solve one-step linear equations in one variable involving non-negative rational numbers.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will solve one-step linear equations in one variable involving non-negative rational numbers in problems with or without context.</p>		<p><u>Sample Stems</u></p> <p>Find the missing length of the rectangle with an area of 52 square inches, if one side length is 6.5 inches.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<p>DOK Ceiling: 1</p>		
<p>Item Format: Selected Response, Constructed Response, Technology Enhanced</p>		

Grade 6 Mathematics

Mathematics		6.EE1.B.8.a
EEI	Expressions, Equations and Inequalities	
B	Reason about and solve one-variable equations and inequalities.	
8	Recognize that inequalities may have infinitely many solutions.	
a	Write an inequality of the form $x > c$, $x < c$, $x \geq c$, or $x \leq c$ to represent a constraint or condition.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.EE1.B.8 (a and b) show how 6th grade students will recognize that inequalities may have infinitely many solutions.</p> <p>The student will write an inequality of the form $x > c$, $x < c$, $x \geq c$ or, $x \leq c$ to represent a constraint or condition in a context or mathematical situation, where c is a constant. Note that the problem or the student’s response to the inequality may be reversed, e.g., $x < c$ or $c > x$.</p> <p>The student will describe the meaning of the unknown quantity (variable) in terms of the context of the problem.</p>		<p><u>Sample Stems</u></p> <p>Bob is taller than John. John is 48 inches tall. Write an inequality to represent their heights given the constraint provided.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit the value of c to rational numbers.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.EE1.B.8.b
EEI	Expressions, Equations and Inequalities	
B	Reason about and solve one-variable equations and inequalities.	
8	Recognize that inequalities may have infinitely many solutions.	
b	Graph the solution set of an inequality.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.EE1.B.8 (a and b) show how 6th grade students will recognize that inequalities may have infinitely many solutions.</p> <p>The student will graph solutions of inequalities, with or without context, on a number line.</p> <p>The student will recognize if the value is included (closed circle) or excluded (open circle) when graphing and graph the situation appropriately.</p>		<p><u>Sample Stems</u></p> <p>Create an inequality that represents the amount of homework your math teacher likes to assign over a weekend. Graph the inequality on a number line.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

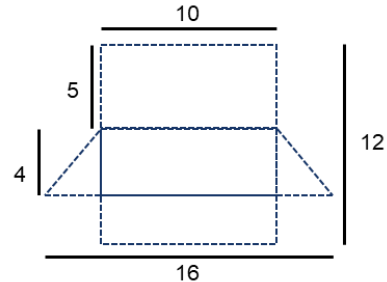
Grade 6 Mathematics

Mathematics		6.EE1.C.9.a
EEI	Expressions, Equations and Inequalities	PRIORITY STANDARD
C	Represent and analyze quantitative relationships between dependent and independent variables.	
9	Identify and describe relationships between two variables that change in relationship to one another.	
a	Write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable.	
<u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u>		<u>Sample Stems</u> <p>According to the M&M website, there are 14 yellow M&Ms in each 8 oz. bag. Write an equation that could determine how many bags will be needed for a given situation. Be sure to identify the dependent and independent variables and what they mean in this problem.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u> <p>Limit to two-variables with one operation. Limit to positive rational numbers.</p>		<u>Calculator Designation</u> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

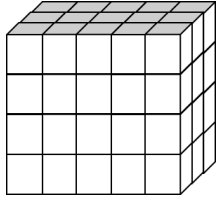
Grade 6 Mathematics

Mathematics		6.EE1.C.9.b
EEI	Expressions, Equations and Inequalities	PRIORITY STANDARD
C	Represent and analyze quantitative relationships between dependent and independent variables.	
9	Identify and describe relationships between two variables that change in relationship to one another.	
b	Analyze the relationship between the dependent and independent variables using graphs, tables and equations and relate these representations to each other.	
<u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u> <p>The expectations in 6.EE1.C.9 (a and b) show how 6th grade students will identify and describe relationships between two variables that change in relationship to one another, e.g., plant growth related to time.</p> <p>The student will analyze by describing the relationship between the dependent and independent variables using graphs, tables and equations and relate these representations to each other.</p> <p>The student will determine the independent value given a dependent value (and vice versa) using graphs, tables, and equations.</p> <p>The student will use an equation (rule) to graph a relationship or complete a table.</p> <p>The student will compare (relate) these representations.</p>		<u>Sample Stems</u> <p>Tia fills a water bottle using a water fountain. Tia has determined that the water fountain fills a 16 oz. bottle in 5 seconds.</p> <p>Use an equation, table, or graph to show how the dependent and independent variables for this situation relate.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u> <p>Limit to positive rational numbers. Limit the graphs to the first quadrant.</p>		<u>Calculator Designation</u> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

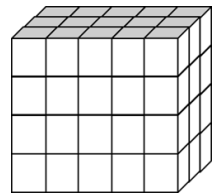
Grade 6 Mathematics

Mathematics		6.GM.A.1
GM A 1	Geometry and Measurement Solve problems involving area, surface area and volume. Find the area of polygons by composing or decomposing the shapes into rectangles or triangles.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will find the area of polygons by composing or decomposing the shapes into rectangles or triangles and/or applying these techniques to solve problems with or without context.</p>		<p><u>Sample Stems</u></p> <p>The net of a triangular prism and its dimensions are shown below. What is the total area of all the prism's sides?</p>  <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit the dimensions to positive rational numbers.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<p><u>DOK Ceiling:</u> 3</p>		
<p><u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced</p>		

Grade 6 Mathematics

Mathematics		6.GM.A.2.a
GM	Geometry and Measurement	
A	Solve problems involving area, surface area and volume.	
2	Find the volume of right rectangular prisms.	
a	Understand that the volume of a right rectangular prism can be found by filling the prism with multiple layers of the base.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.GM.A.2 (a and b) show how 6th grade students will find the volume of right rectangular prisms.</p> <p>The student will understand that the volume of a right rectangular prism can be found by filling the prism with multiple layers of the base. Students will be given the opportunity to discover that using visual models, e.g., model by packing, produces the same volume as using the formulas, whether the side lengths are whole or fractional edge lengths.</p>		<p><u>Sample Stems</u></p> <p>Use the model below to explain how the volume of this rectangular prism can be found by filling multiple layers of the base. Be sure to include mathematical terms in your explanation.</p>  <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit the dimensions to positive rational numbers.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

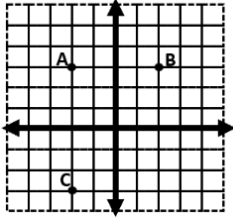
Grade 6 Mathematics

Mathematics		6.GM.A.2.b
GM	Geometry and Measurement	
A	Solve problems involving area, surface area and volume.	
2	Find the volume of right rectangular prisms.	
b	Apply $V = l * w * h$ and $V = Bh$ to find the volume of right rectangular prisms.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.GM.A.2 (a and b) show how 6th grade students will find the volume of right rectangular prisms.</p> <p>The student will apply $V = l * w * h$ and $V = Bh$ (where B represents the area of the base) to find the volume of right rectangular prisms with whole or fractional edges for problems with or without context.</p> <p>The student will be able to compare and use both volume formulas. Rectangular prisms have more than one base depending on its orientation. It is important to understand the relationship of the base to the height (perpendicular to each other) to determine how they are identified.</p>		<p><u>Sample Stems</u></p> <p>Three students are discussing finding the volume of the rectangular prism shown below. One student says to find the volume you must use the formula $V = l * w * h$ and the other student claims that you really could just use the formula, $V = Bh$. The third student believes the others are both correct. If the third student is correct, how can the other students' formulas both work?</p>  <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit dimensions to positive rational numbers.</p> <p>Limit unit conversions to the same measurement system.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

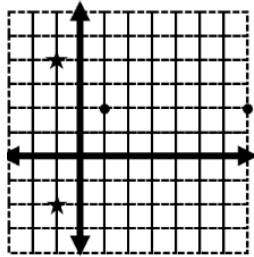
Grade 6 Mathematics

Mathematics		6.GM.A.3.a
GM	Geometry and Measurement	PRIORITY STANDARD
A	Solve problems involving area, surface area and volume.	
3	Solve problems by graphing points in all four quadrants of the Cartesian coordinate plane.	
a	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the Cartesian coordinate plane.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.GM.A.3 (a through d) show how 6th grade students will solve problems with or without context, by graphing points in all four quadrants of the Cartesian coordinate plane.</p> <p>The student will understand signs of numbers in ordered pairs as indicating locations in quadrants of the Cartesian coordinate plane.</p> <p>The student will understand the x-axis is a horizontal number line and the y-axis is a vertical number line.</p> <p>The student will understand that the order of an ordered pair is (x, y) or (horizontal move, vertical move) from the origin (0,0).</p> <p>The student will understand that the x- and y-axes intersect perpendicular at the origin (0, 0) creating four quadrants and that in each quadrant the x and y coordinates have special relationships, e.g., in the first quadrant both x and y are positive.</p>		<p><u>Sample Stems</u></p> <p>Team Circle is trying to beat Team Star in a game where students are to connect 4 markers in a row, column or diagonally. What coordinate could Team Circle use to win the game shown on the board below?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to integers or contextual rational units, e.g. money.</p> <p>Limit items including a graph to ordered pairs that are on the intersections of the coordinate grid lines.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 2		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.GM.A.3.b
GM	Geometry and Measurement	PRIORITY STANDARD
A	Solve problems involving area, surface area and volume.	
3	Solve problems by graphing points in all four quadrants of the Cartesian coordinate plane.	
b	Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.GM.A.3 (a through d) show how 6th grade students will solve problems with or without context, by graphing points in all four quadrants of the Cartesian coordinate plane.</p> <p>The student will recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. This is possible because when ordered pairs are reflected about an axis, they are equidistant from the reflection axis.</p> <p>The student will be able to describe the impact of reflecting an ordered pair across one or both axes, e.g., when (x, y) is reflected over the x-axis it results in (x, -y).</p>		<p><u>Sample Stems</u></p> <p>Identify the 3 coordinates in the graph below. A student looking at the coordinates observes that point A and B have similar values, but one x-value is an additive inverse of the other. Do you agree with this student? Describe how each coordinate compares with the others (what is alike and different including values and axis relationship).</p>  <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to integers or contextual rational units.</p> <p>Limit items including a graph to ordered pairs that are on the intersections of the coordinate grid lines.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
DOK Ceiling: 3		
Item Format: Selected Response, Constructed Response, Technology Enhanced		

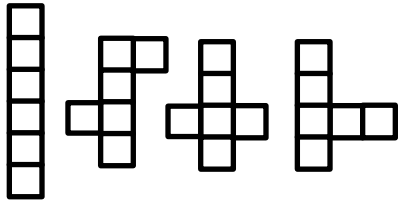
Grade 6 Mathematics

Mathematics		6.GM.A.3.c
GM	Geometry and Measurement	PRIORITY STANDARD
A	Solve problems involving area, surface area and volume.	
3	Solve problems by graphing points in all four quadrants of the Cartesian coordinate plane.	
c	Find distances between points with the same first coordinate or the same second coordinate.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.GM.A.3 (a through d) show how 6th grade students will solve problems with or without context, by graphing points in all four quadrants of the Cartesian coordinate plane.</p> <p>The student will find the distance between two points with the same x value and different y values (vertical line) using coordinates and absolute value.</p> <p>The student will find the distance between two points with the same y value and different x values (horizontal line) using coordinates and absolute value.</p>		<p><u>Sample Stems</u></p> <p>List the 4 coordinates in the graph below. Calculate the distance between the 2 stars and between the two circles. Identify any patterns, e.g., being vertical or horizontal, having same x or y values, you notice as you are finding these distances.</p>  <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to integers or contextual rational units.</p> <p>Limit items including a graph to ordered pairs that are on the intersections of the coordinate grid lines.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

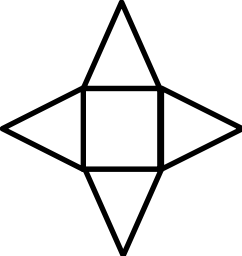
Grade 6 Mathematics

Mathematics		6.GM.A.3.d
GM	Geometry and Measurement	PRIORITY STANDARD
A	Solve problems involving area, surface area and volume.	
3	Solve problems by graphing points in all four quadrants of the Cartesian coordinate plane.	
d	Construct polygons in the Cartesian coordinate plane.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.GM.A.3 (a through d) show how 6th grade students will solve problems with or without context, by graphing points in all four quadrants of the Cartesian coordinate plane.</p> <p>The student will draw polygons in the Cartesian coordinate plane given coordinates for the vertices.</p> <p>The student will identify the coordinates of a missing vertex (or missing vertices) of a given polygon.</p> <p>In grade 6, constructing polygons means students use what they understand about the characteristics of polygons to solve problems, e.g., construct a rectangle given a vertex and the distance to two adjacent points; given 3 vertices to identify the fourth vertex of a rectangle.</p>		<p><u>Sample Stems</u></p> <p>Construct a rectangle using the coordinate plane below. The next coordinate is seven units away from (-1, -1). Identify all 4 coordinates after completing the rectangle.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit items including a graph to ordered pairs that are on the intersections of the coordinate grid lines.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.GM.A.4.a
GM	Geometry and Measurement	
A	Solve problems involving area, surface area and volume.	
4	Solve problems using nets.	
a	Represent three-dimensional figures using nets made up of rectangles and triangles.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.GM.A.4 (a and b) show how 6th grade students will solve problems with or without context using nets.</p> <p>The student will represent three-dimensional figures using nets made up of rectangles and triangles.</p> <p>The student will recognize the relationship between a three-dimensional figure and its two-dimensional net.</p>		<p><u>Sample Stems</u></p> <p>There has been a class discussion on which nets could be used to create a cube. Some students believe each of these will make a cube. Do you agree? Explain your reasoning for each of these nets.</p>  <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit figures to right prisms and pyramids with rectangular or triangular bases.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.GM.A.4.b
GM	Geometry and Measurement	
A	Solve problems involving area, surface area and volume.	
4	Solve problems using nets.	
b	Use nets to find the surface area of three-dimensional figures whose sides are made up of rectangles and triangles.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.GM.A.4 (a and b) show how 6th grade students will solve problems with or without context using nets.</p> <p>The student will use nets to find the surface area of three-dimensional figures whose faces are made up of rectangles and triangles.</p>		<p><u>Sample Stems</u></p> <p>Find the surface area of the square base pyramid shown below. The length of one side of the base is 4 cm and the height of the triangular side is 6 cm.</p>  <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit problems with any triangular face so the height is given.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

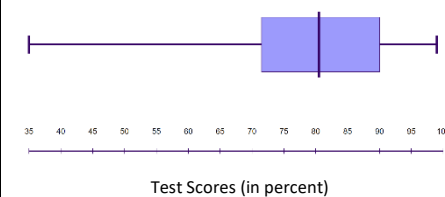
Grade 6 Mathematics

Mathematics		6.DSP.A.1
DSP A 1	Data Analysis, Statistics and Probability Develop understanding of statistical variability Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.	
<u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u> The student will recognize a statistical question as one that anticipates variability (a variety of possible responses) in the data, e.g., “How tall am I?” is not a statistical question, however “How tall are the students in my school?” is a statistical question.		<u>Sample Stems</u> A math class is exploring what characteristics identify examples of statistical questions. One student lists two questions, “What type of pet do I have?” and “What pets do students in this class have at home?”. Indicate whether either of these are statistical questions and give characteristics that make a statistical question. <

Grade 6 Mathematics

Mathematics		6.DSP.A.2
DSP	Data Analysis, Statistics and Probability	PRIORITY STANDARD
A	Develop understanding of statistical variability	
2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread and overall shape.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The student will use the distribution of data collected in answering a statistical question. The shape of the data can be represented by a graph or table showing the distribution of values, e.g., where the data clusters. The overall shape of a distribution develops a stronger understanding of the measures of center and spread.</p> <p>In sixth grade, the measure of center for a distribution will include mean, median, or mode and the measure of spread for a distribution includes range, interquartile range, or mean absolute deviation.</p>		<p><u>Sample Stems</u></p> <p>After using a student generated statistical question, collect the answers to the question. Describe the data set using its center, spread and overall shape? Be sure to include the meaning of center, spread and overall shape in the description.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to only positive rational numbers.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

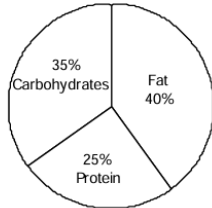
Grade 6 Mathematics

Mathematics		6.DSP.A.3
DSP A 3	Data Analysis, Statistics and Probability Develop understanding of statistical variability Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary from a single number.	
<u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u> <p>The student will recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary from a single number.</p> <p>The student will recognize the effects of extreme data points, e.g., visual outliers, on the measures of center.</p> <p>The student will understand how the existence of extreme data points may impact measures of variation, e.g., different sets of data could have the same mean but have different ranges.</p>		<u>Sample Stems</u> <p>A student's tests scores (in percent) for the semester are: 99, 98, 97, 95, 85, 82, 82, 91, 80, 79, 76, 73, 70, 60, 55, 35. These scores are represented in the following box and whisker plot. The mean (average) of their scores is 77.93%. Do you think this is a good representation of the data? Would another measure of center or variation be a better representation of the data set? Why?</p>  <p style="text-align: center;">Test Scores (in percent)</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u> Limit to only positive rational numbers.		<u>Calculator Designation</u> YES – a calculator will be available for items
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

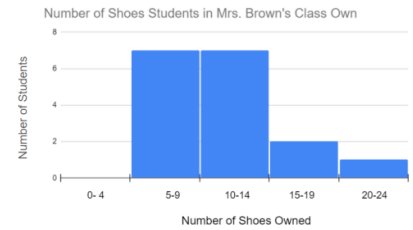
Grade 6 Mathematics

Mathematics		6.DSP.B.4.a										
DSP B 4 a	Data Analysis, Statistics and Probability Summarize and describe distributions. Display and interpret data. Use dot plots, histograms and box plots to display and interpret numerical data.											
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.DSP.B.4 (a and b) show how 6th grade students will display and interpret data.</p> <p>The student will use dot plots, histograms, and box plots to display and interpret numerical data.</p> <p>The student will use graphical displays of data to solve problems with or without context.</p>		<p><u>Sample Stems</u></p> <p>Students in Mrs. Brown’s class were asked how many hours they spend playing sports per week. The data is below. Create a histogram to represent the data. What inferences can you draw from the data?</p> <table><tr><th>Interval (in hours)</th><th>Frequency</th></tr><tr><td>0-3.9</td><td>10</td></tr><tr><td>4-7.9</td><td>3</td></tr><tr><td>8-11.9</td><td>15</td></tr><tr><td>12-15.9</td><td>1</td></tr></table> <p>Additional Stems for 6th Grade Found at End of Document.</p>	Interval (in hours)	Frequency	0-3.9	10	4-7.9	3	8-11.9	15	12-15.9	1
Interval (in hours)	Frequency											
0-3.9	10											
4-7.9	3											
8-11.9	15											
12-15.9	1											
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to only positive rational numbers.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>										
<p>DOK Ceiling: 3</p>												
<p>Item Format: Selected Response, Constructed Response, Technology Enhanced</p>												

Grade 6 Mathematics

Mathematics		6.DSP.B.4.b								
DSP B 4 b	Data Analysis, Statistics and Probability Summarize and describe distributions. Display and interpret data. Create and interpret circle graphs.									
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.DSP.B.4 (a and b) show how 6th grade students will display and interpret data.</p> <p>The student will understand that circle graphs are used for categorical data.</p> <p>The student will create circle graphs, e.g., sketched by hand or using technology, and interpret the data in problems with or without context.</p>		<p><u>Sample Stems</u></p> <p>The micronutrients of a specific brand of peanut butter are shown in the circle graph below. If someone eats 424g of peanut butter, how many grams of protein will they intake?</p> <div><p>Contents of Peanut Butter</p><table border="1"><caption>Contents of Peanut Butter</caption><thead><tr><th>Component</th><th>Percentage</th></tr></thead><tbody><tr><td>Fat</td><td>40%</td></tr><tr><td>Carbohydrates</td><td>35%</td></tr><tr><td>Protein</td><td>25%</td></tr></tbody></table></div> <p>Additional Stems for 6th Grade Found at End of Document.</p>	Component	Percentage	Fat	40%	Carbohydrates	35%	Protein	25%
Component	Percentage									
Fat	40%									
Carbohydrates	35%									
Protein	25%									
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>								
<p><u>DOK Ceiling:</u> 3</p>										
<p>Item Format: Selected Response, Constructed Response, Technology Enhanced</p>										

Grade 6 Mathematics

Mathematics		6.DSP.B.5.a
DSP	Data Analysis, Statistics and Probability	
B	Summarize and describe distributions.	
5	Summarize numerical data sets in relation to the context.	
a	Report the number of observations.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.DSP.B.5 (a through d) show how 6th grade students will summarize numerical data sets in relation to the context.</p> <p>The student will report the number of observations.</p>		<p><u>Sample Stems</u></p> <p>How many students were surveyed for the histogram below?</p>  <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 1		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.DSP.B.5.b
DSP	Data Analysis, Statistics and Probability	
B	Summarize and describe distributions.	
5	Summarize numerical data sets in relation to the context.	
b	Describe the nature of the attribute under investigation, including how it was measured and its units of measurement.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.DSP.B.5 (a through d) show how 6th grade students will summarize numerical data sets in relation to the context.</p> <p>The student will summarize numerical data sets in relation to their context by describing the nature of the attribute under investigation, e.g., what is being measured, including how it was measured and its units of measurement.</p>		<p><u>Sample Stems</u></p> <p>Several students from Jefferson MS ran in a 2K race. The coach displayed the time (in minutes) it took the runners to finish the race. What is the attribute being measured?</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>No Limits.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.DSP.B.5.c
DSP	Data Analysis, Statistics and Probability	
B	Summarize and describe distributions.	
5	Summarize numerical data sets in relation to the context.	
c	Give quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context of the data	
<u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u> <p>The expectations in 6.DSP.B.5 (a through d) show how 6th grade students will summarize numerical data sets in relation to the context.</p> <p>The student will summarize numerical data sets in relation to their context by determining/calculating quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation).</p> <p>The student will describe any overall pattern and any striking deviations (extreme data points) from the overall pattern with reference to the context of the data.</p>		<u>Sample Stems</u> <p>Below are the heights, in inches, for a 6th grade classroom.</p> <p>57, 59, 58, 58, 59, 58, 60, 61, 68, 55, 54, 57, 59, 67, 69, 57, 56</p> <p>Using the classroom heights, calculate the measures of center (median and mean) and the variability (interquartile range). Based on the data and measures calculated, describe the overall pattern based on the context of this situation.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u> <p>Limit to positive rational numbers. Limit data set to no more than five values when calculating mean absolute deviation.</p>		<u>Calculator Designation</u> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling:</u> 3		
<u>Item Format:</u> Selected Response, Constructed Response, Technology Enhanced		

Grade 6 Mathematics

Mathematics		6.DSP.B.5.d
DSP	Data Analysis, Statistics and Probability	PRIORITY STANDARD
B	Summarize and describe distributions.	
5	Summarize numerical data sets in relation to the context.	
d	Analyze the choice of measures of center and variability based on the shape of the data distribution and/or the context of the data.	
<p><u>Expectation Unwrapped – the intent of this section is to describe the elements of the expectation, but are NOT additional standards or expectations.</u></p> <p>The expectations in 6.DSP.B.5 (a through d) show how 6th grade students will summarize numerical data sets in relation to the context.</p> <p>The student will analyze the choice of measures of center and variability based on the shape of the data distribution and the context of the data.</p>		<p><u>Sample Stems</u></p> <p>Below are the heights, in inches, for a 6th grade classroom.</p> <p>57, 59, 58, 58, 59, 58, 60, 61, 68, 55, 54, 57, 59, 67, 69, 57, 56</p> <p>Tina and Trace are discussing the best measure of center to represent the classroom height. Tina believes that the median will be best, and Trace thinks it would be the mean. Which student do you agree with and why. Be sure to support your answer using the shape of the distribution and the context of the situation.</p> <p>Additional Stems for 6th Grade Found at End of Document.</p>
<p><u>State Assessment Content Limits/Boundaries - Classroom Work Should Extend Beyond These Limits</u></p> <p>Limit to positive rational numbers.</p>		<p><u>Calculator Designation</u></p> <p>YES – a calculator will be available for items</p>
<u>DOK Ceiling: 3</u>		
Item Format: Selected Response, Constructed Response, Technology Enhanced		

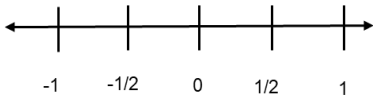
Grade 6 Mathematics

Code	Sample Stem	Explanation										
6.RP.A.1	Simon wants to plant a garden where the length to width ratio is 5:2. He has a plot that is 12 feet long by 8 feet wide, how does this plot compare to the desired ratio?											
	A TV sells for \$450. The store’s wholesale price was \$375. What is the ratio of the profit to the wholesale price?											
6.RP.A.2	Jason drove 225 miles in 3 hours. Find and interpret the unit rate for the trip.											
6.RP.A.3a	<p>According to the M&M website, there are 14 yellow M&Ms in each 8 oz. bag. If you need 75 yellow M&Ms for an art project, how many bags will you need to purchase? Use the chart to help determine your answer.</p> <table><tr><th>Number of Bags</th><th>Number of Yellow M&Ms</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table> <p>If you were to graph your chart values, how would the graph show the number of bags you would need for your art project?</p>	Number of Bags	Number of Yellow M&Ms									
Number of Bags	Number of Yellow M&Ms											
6.RP.A.3b	Jane needs sugar. Should she buy a four-pound bag for \$2.58 or a five-pound bag that is on sale for \$3.25 if she wants the best deal? Explain how she could determine the best deal and identify the unit rate she might have used in making her decision.											
	Simon wants to plant a garden where the length to width ratio is 5:2. If he already has a plot that is 12 feet long by 8 feet wide, how much must he add to the length to get the desired ratio?											
6.RP.A.3c	Jada has a new puppy that weighs 9 pounds. The vet says that the puppy is now at about 30% of its adult weight. What will be the adult weight of the puppy?											
6.RP.A.3d	Jimmy grew 2 inches during the school year and his best friend grew 5 centimeters. Given a conversion factor, e.g., 1 in. = 2.54 cm, use ratios to compare which student grew more.											

Grade 6 Mathematics

Code	Sample Stem	Explanation											
6.NS.A.1a	Sheila has $\frac{5}{8}$ pound of sugar. She needs $\frac{1}{4}$ pound of sugar for each batch of jelly. Does Sheila have enough to make three batches? Explain how you know.												
	Mary bought $12\frac{1}{2}$ yards of fabric. Each craft project requires $1\frac{7}{8}$ yards. How many craft projects can she complete?												
	Katie claims that the solution to this problem will be less than one. Determine if Katie is correct and justify your conclusion using words, pictures, math sentences or other math. $\frac{1}{2} \div \frac{3}{4} = ?$												
	Dana is solving the following problem: $2 \div \frac{2}{3} =$ Dana drew the following model to represent this situation and found the answer to be 6. <table border="1"><tr><td colspan="3">1</td><td colspan="3">1</td></tr><tr><td>$\frac{1}{3}$</td><td>$\frac{1}{3}$</td><td>$\frac{1}{3}$</td><td>$\frac{1}{3}$</td><td>$\frac{1}{3}$</td><td>$\frac{1}{3}$</td></tr></table> Is Dana correct? Explain how her model does/does not represent the problem and its solution.	1			1			$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$
1			1										
$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$								
6.NS.B.2	A student is exploring different ways to show what happens when they divide two numbers. How could a student use what they know about $600 \div 25$ to show what $825 \div 25$ equals?												
6.NS.B.3	Teddy has been told the rule to move decimals when multiplying two numbers. While he can use the rule, he wants to understand why that rule works as described. Use the problem $.4 \times 1.2$ to model ways to help Teddy see why the rule works. Use your model(s) to explain why the rule must always work.												
	Teri's teacher has shared a rule when multiplying or dividing with decimals. The rule involves moving the decimal point. Pick two decimal numbers and use them to show what must happen when you multiply and divide by those numbers. The explanation could include models or other mathematical descriptions.												

Grade 6 Mathematics

Code	Sample Stem	Explanation
6.NS.B.4a	Hotdogs come in a package of 8 and buns in a package of 12. How many packages of hot dogs and packages of buns would you need to purchase to have an equal number of hot dogs and buns?	
	At the fair there are 2 Ferris wheels. One takes 50 seconds to go all the way around, the other takes 30 seconds. If Jason and his sister both get on a different Ferris wheel at the same time, how many seconds must pass for them both to be on the ground at the same time? How many revolutions must Jason go around? How many revolutions must his sister?	
6.NS.B.4b	Use the distributive property to show an equivalent expression for the problem listed below. $66 + 90$	
	Create equivalent expressions to the sum of two whole numbers using factors and the distributive property.	
6.NS.C.5	Use positive and negative numbers to represent the result of the following situation. A basketball team gained 4 new players after 6 players left the team.	
6.NS.C.6a	<p>The fraction $\frac{7}{9}$ is closest to what number on a number line?</p>  <p style="text-align: center;">-1 -1/2 0 1/2 1</p>	
6.NS.C.6b	<p>Place the following numbers in order from least to greatest. Be sure to explain why you have ordered them in this way.</p> <p style="text-align: center;">$\frac{25}{8}$ 3.111111 $\frac{23}{9}$ $2\frac{4}{5}$</p>	
6.NS.C.6c	Identify the additive inverse of -5 and use a number line to explain what is special about numbers that are additive inverses to each other.	

Grade 6 Mathematics

	<p>Two houses are marked on the following graph. Joan says she lives farther from the library than Adam. Is she correct? Why or why not?</p> <p>The graph shows a coordinate plane with x and y axes ranging from -4 to 4. The Library is marked at (-4, 0). Joan's House is marked at (-4, 3). Adam's House is marked at (-4, -3).</p>	
6.NS.C.7	When is the absolute value of a number equal to zero? Why is the absolute value positive?	Students should understand absolute value is a distance which is always positive, but the number zero is zero units from itself.
6.NS.C.8	Write two numbers that are equivalent to 0.045.	
	Using a 10x10 grid, identify the decimal and percent equivalents of $\frac{4}{5}$. Explain how you know that the fraction, decimal, and percent are equivalent.	
6.EE1.A.1	How are equations and expressions similar? How are they different? Explain.	
	<p>Tammy makes the following claims about expressions.</p> <ol style="list-style-type: none"> They contain only numbers. They contain variables. They are the same as equations. They do not have an equal sign. <p>Do you agree with Tammy? Explain why or why not for each of Tammy's claims.</p>	
6.EE1.A.2a	<p>Using the expression listed below list the characteristics (parts of the expression) that describe this situation. (Note: characteristics include - terms, number of terms, coefficients, exponents, constants, and variables).</p> $10 - 6x^2 + 15x$	
	<p>Does the number 3 represent the same part of these expressions? Why or why not?</p> $3x + 1 \quad x^3 \quad x + 3$	This allows student to explain differences between a coefficient, exponent and constant

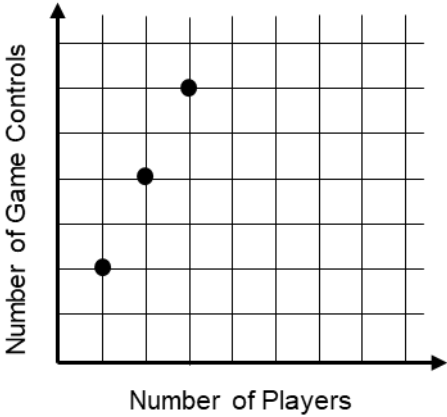
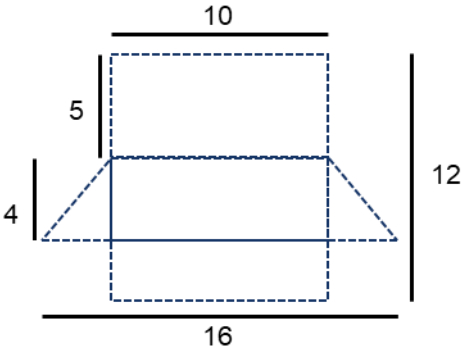
Grade 6 Mathematics

Code	Sample Stem	Explanation
6.EE1.A.2b	Evaluate the following expression when x equals 1, 5 and 10. $10 + 6x^2 + 15x$	
6.EE1.A.2c	Evaluate the following expression when x =4.2 and y =2 y^3xy	
6.EE1.A.2d	Use the following information to write an algebraic expression, then solve that expression. Tomi is growing a sunflower plant. When Tomi got the plant, it was 7 inches tall. Over the next several weeks, Tomi found that the plant was growing 10 inches per week. How tall will the sunflower be after 10 weeks?	
	Use the following information to create an algebraic expression. Alex has 6 dollars less than James. If James has 473 dollars, solve the expression.	This allows for the student to choose the variable and create the expression. The expression can be written to represent Alex's money either focused on Alex or referenced to James' money
6.EE1.A.2e	Rex used the expression below to represent the following situation. Alex has 6 dollars less than James. $j - 6$ Describe the meaning of the variable given this situation.	
6.EE1.A.3	2(30 + 20) and 250 - 150 are both expressions that use different properties to represent 100. Using different properties, create two different expressions that represent 50.	This is low floor but high ceiling. Students can create unique expressions to represent 50
	Which properties can be used to show that these expressions are equivalent? $4(30 + 25)$, $4(25 + 30)$, $4(25) + 4(30)$	Students can explain how the properties connect/change between expressions
	Identify which of the expressions below are equivalent to $8(t+4)$, $8t+4$, or neither: $4(2t+1)$, $8t+32$, $(8+t) + (8+4)$, $(8*t) + (8*4)$, $8t+12$, $2(4t+2)$, $4t+4+4t$	
6.EE1.B.4	Is $y = 4$ a solution to $2y + 1 > 9$? Explain why or why not.	Students should understand what is needed to be considered a solution to equations or inequalities.

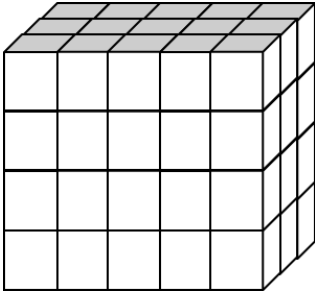
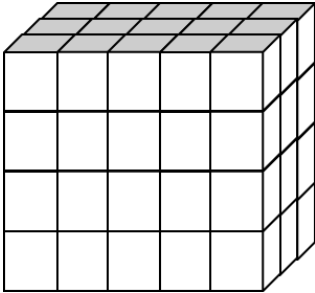
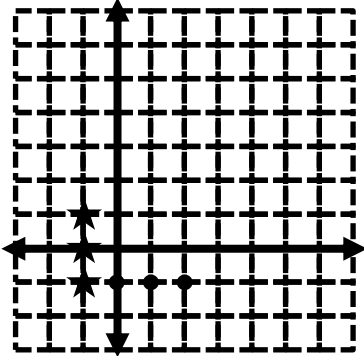
Grade 6 Mathematics

Code	Sample Stem	Explanation
6.EE1.B.5	<p>Jason earns \$9.25 an hour working and needs at least \$140 more for a new baseball bat. He wrote this inequality to represent the situation,</p> $9.25h \geq \$140$ <p>What does h represent in the inequality? What does your solution mean?</p>	
6.EE1.B.6	One-third of a number is equal to 13. Write an algebraic equation that represents this situation. Solve for your variable and describe the meaning of the variable in this context.	
	Create a problem that can be represented with an equation using variables and write the equation. Solve your equation and be sure to indicate the meaning of the variable in the context of your problem.	
6.EE1.B.7	Find the missing length of the rectangle with an area of 52 square inches, if one side length is 6.5 inches.	
6.EE1.B.8a	Bob is taller than John. John is 48 inches tall. Write an inequality to represent their heights given the constraint provided.	
6.EE1.B.8b	Create an inequality that represents the amount of homework your math teacher likes to assign over a weekend. Graph your inequality on a number line.	
6.EE1.C.9a	According to the M&M website, there are 14 yellow M&Ms in each 8 oz. bag. Write an equation that could determine how many bags will be needed for a given situation. Be sure to identify the dependent and independent variables and what they mean in this problem.	

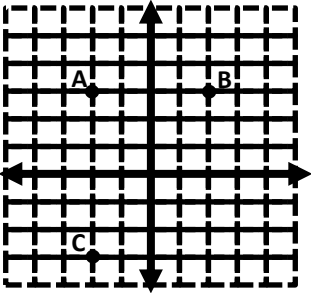
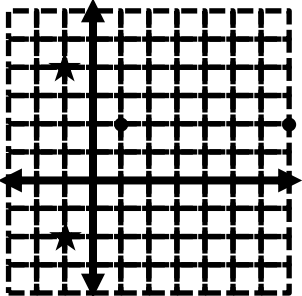
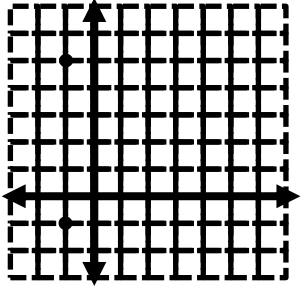
Grade 6 Mathematics

Code	Sample Stem	Explanation
6.EE1.C.9b	<p>Using the graph below, analyze the relationship between the dependent and independent variables described in the graph. Be sure to indicate which is the independent and dependent variables.</p> 	
	<p>Tia fills a water bottle using a water fountain.</p> <p>Use an equation, table, or graph to show how the dependent and independent variables for this situation relate. Tia has determined that the water fountain fills a 16 oz. bottle in 5 seconds.</p>	
6.GM.A.1	 <p>The net of a triangular prism and its dimensions are shown above. What is the total area of all the prism's sides?</p>	

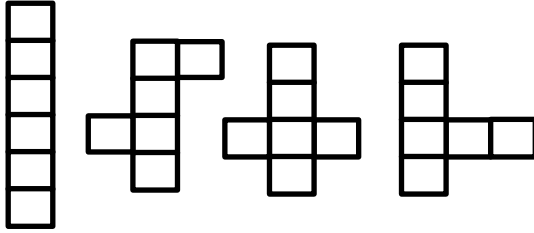
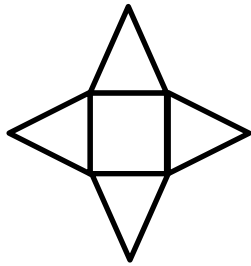
Grade 6 Mathematics

Code	Sample Stem	Explanation
6.GM.A.2a	<p>Use the model below to explain how the volume of this rectangular prism can be found by filling multiple layers of the base. Be sure to include mathematical terms in your explanation.</p> 	
6.GM.A.2b	<p>Three students are discussing finding the volume of the rectangular prism shown below. One student says to find the volume you must use the formula $V = l * w * h$ and the other student claims that you really could just use the formula, $V = Bh$. The third student believes the others are both correct. If the third student is correct, how can the other students' formulas both work?</p> 	
6.GM.A.3a	<p>Team Circle is trying to beat Team Star in a game where students are to connect 4 markers in a row, column or diagonally. What coordinate could Team Circle use to win the game shown on the board below?</p> 	

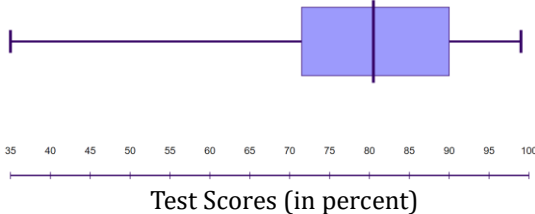
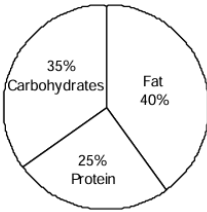
Grade 6 Mathematics

Code	Sample Stem	Explanation
6.GM.A.3b	<p>Identify the 3 coordinates in the graph below. A student looking at the coordinates observes that point A and B have similar values, but one x-value is an additive inverse of the other. Do you agree with this student? Describe how each coordinate compares with the others (what is alike and different including values and axis relationship).</p> 	
6.GM.A.3c	<p>List the 4 coordinates in the graph below. Calculate the distance between the 2 stars and between the two circles. Identify any patterns (e.g., being vertical or horizontal, having same x or y values) you notice as you are finding these distances.</p> 	
6.GM.A.3d	<p>Construct a rectangle using the coordinate plane below. The next coordinate is seven units away from (-1, -1). Identify all 4 coordinates after completing the rectangle.</p> 	

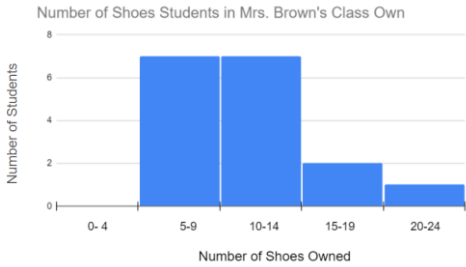
Grade 6 Mathematics

Code	Sample Stem	Explanation
6.GM.A.4a	<p>There has been a class discussion on which nets could be used to create a cube. Some students believe each of these will make a cube. Do you agree? Explain your reasoning for each of these nets.</p> 	
6.GM.A.4b	<p>Find the surface area of the square base pyramid shown below. The length of one side of the base is 4 cm and the height of the triangular side is 6 cm.</p> 	
6.DSP.A.1	<p>A math class is exploring what characteristics identify examples of statistical questions. One student lists two questions, "What type of pet do I have?" and "What pets do students in this class have at home?". Indicate whether either of these are statistical questions, and give characteristics that make a statistical question.</p>	
6.DSP. A.2	<p>After using a student generated statistical question, collect the answers to the question. Describe the data set using its center, spread and overall shape? Be sure to include the meaning of center, spread and overall shape in the description.</p>	<p>When working to create and use statistical questions, students should generate the answers to that question in a data set. The use of an appropriate statistical question should allow the collected data set to be a distribution which can be described by its center, spread and overall shape.</p>
	<p>In reviewing a set of data, students see that the mean (average) family size in the U.S. is 3.13 persons. Johnny says this suggests that most families have 3.13 people in them. Is his statement true? Why or why not?</p>	<p>Given the way this problem is worded, there are multiple correct responses. Please note that more complete responses will include those where students indicate the meaning of 3.13 given the context of the situation (especially the importance of the .13 part of the average).</p>

Grade 6 Mathematics

Code	Sample Stem	Explanation										
6.DSP.A.3	<p>Explain the difference between a measure of center and a measure of variation in the context of statistical analysis.</p>											
	<p>A student’s tests scores (in percent) for the semester are: 99, 98, 97, 95, 85, 82, 82, 91, 80, 79, 76, 73, 70, 60, 55, 35. These scores are represented in the following box and whisker plot. The mean (average) of their scores is 77.93%. Do you think this is a good representation of the data? Would another measure of center or variation be a better representation of the data set? Why?</p>  <p>Test Scores (in percent)</p>											
6.DSP.B.4a	<p>Students in Mrs. Brown’s class were asked how many hours they spend playing sports per week. The data is below. Create a histogram to represent the data. What inferences can you draw from the data?</p> <table border="1"><thead><tr><th>Interval (in hours)</th><th>Frequency</th></tr></thead><tbody><tr><td>0-3.9</td><td>10</td></tr><tr><td>4-7.9</td><td>3</td></tr><tr><td>8-11.9</td><td>15</td></tr><tr><td>12-15.9</td><td>1</td></tr></tbody></table>	Interval (in hours)	Frequency	0-3.9	10	4-7.9	3	8-11.9	15	12-15.9	1	
Interval (in hours)	Frequency											
0-3.9	10											
4-7.9	3											
8-11.9	15											
12-15.9	1											
6.DSP.B.4b	<p>The micronutrients of a specific brand of peanut butter are shown in the circle graph below. If someone eats 424g of peanut butter, how many grams of protein will they intake?</p> 											

Grade 6 Mathematics

Code	Sample Stem	Explanation
6.DSP.B.5a	<p>How many students were surveyed for the histogram below?</p>  <p>Number of Shoes Students in Mrs. Brown's Class Own</p> <p>Number of Students</p> <p>Number of Shoes Owned</p>	
6.DSP.B.5b	<p>Several students from Jefferson MS ran in a 2K race. The coach displayed the time (in minutes) it took the runners to finish the race. What is the attribute being measured?</p>	
6.DSP.B.5c	<p>Below are the heights, in inches, for a 6th grade classroom.</p> <p>57, 59, 58, 58, 59, 58, 60, 61, 68, 55, 54, 57, 59, 67, 69, 57, 56</p> <p>Using the classroom heights, calculate the measures of center (median and mean) and the variability (interquartile range). Based on the data and measures calculated, describe the overall pattern based on the context of this situation.</p>	
6.DSP.B.5d	<p>Below are the heights, in inches, for a 6th grade classroom.</p> <p>57, 59, 58, 58, 59, 58, 60, 61, 68, 55, 54, 57, 59, 67, 69, 57, 56</p> <p>Tina and Trace are discussing the best measure of center to represent the classroom height. Tina believes that the median will be best, and Trace thinks it would be the mean. Which student do you agree with and why. Be sure to support your answer using the shape of the distribution and the context of the situation.</p>	